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(54) Laundry composition containing peroxyacid bleach and soil release agent

Ein Persäurebleichmittel und einen Vergrauungsinhibitor enthaltendes Waschmittel

Composition pour le linge contenant un peroxy-acide comme agent de blanchiment et un agent de
dégagement de souillure

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(56) References cited:
EP-A- 0 120 591 EP-A- 0 201 958
FR-A- 2 276 377 US-A- 4 441 881

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DescriptionFIELD OF THE INVENTION

5 This invention relates to laundry compositions and methods comprising bleach and soil release agents.

BACKGROUND OF THE INVENTION

10 The use of soil release agents in laundry products per se is known in the art.
FR-A-2,276,377 discloses compositions containing a soil release polymer comprising ethylene terephthalate and polyethylene oxide terephthalate units.

US-A-4,441,881 discloses detergent compositions containing nonionic surfactants and cellulose ether.

EP-A-0201958 discloses laundry compositions containing a peroxyacid bleach.

EP-A-0120591 discloses compositions containing a peroxyacid bleach precursor.

15 Soil release agents can be mixed with other laundering components. Examples of laundry detergent compositions containing cellulose ether soil release agents are disclosed in U.S. Pat. Nos. 4,000,093, C.H. Nicol and M.E. Burns, issued Dec. 28, 1976; 4,100,094, M.E. Burns, issued July 11, 1978; and 4,564,463, Secemski et al., issued Jan. 14, 1986. Examples of laundry presoak compositions and rinse additive compositions containing cellulose ether soil release agents are disclosed in U.S. Pat. No. 4,136,038, H.J. Pracht and M.E., Burns, issued Jan. 23, 1979. Examples of
20 laundry detergent compositions containing terephthalate ester/ethylene oxide copolymers are disclosed in U.S. Pat. Nos. 4,132,680, C.H. Nicol, issued Jan. 2, 1979; 4,116,885, Derstadt et al., issued Sept. 26, 1978; and 4,411,831, Robinson et al., issued Oct. 25, 1983.

U.S. Pat. No. 4,132,680, supra, discloses unspecified bleaches as optional adjuncts to a detergent formulation containing a polyester soil release agent, and U.S. Pat. No. 4,210,417, McClain, issued July 1, 1980, discloses that a
25 soil release agent may be incorporated into an unspecified liquid or unspecified dry bleach. U.S. Pat. No. 4,174,305, M.E. Burns, issued Nov. 13, 1979, discloses that perborate bleaches can be incorporated as dry admixes into detergent compositions containing cellulose ether soil release agents. U.S. Pat. No. 4,116,885, supra, discloses that bleaching agents can be incorporated into detergent formulations containing polyester soil release agents, specific examples given were chlorinated trisodium phosphate, and sodium and potassium salts of dichloroisocyanuric acid.

30 In none of the above disclosures was there an indication of superior or synergistic performance benefits in using any type of bleach in combination with a soil release agent.

Organic peroxyacid bleaches are known; but it is believed that heretofore they have not been known to be used in combination with soil release agents.

35 OBJECTS OF THE INVENTION

It is an object of the present invention to provide an improved laundry cleaning product which provides superior bleaching and cleaning of hydrophobic soils on synthetic fabrics and synthetic natural blend fabrics by use of a combination of peroxyacid bleaches and a soil release agent.

40 It is a further object of the present invention to provide laundry cleaning formulations which employ a peroxyacid bleach and a soil release agent to achieve performance beyond that possible with a comparable amount of either the peroxyacid or the soil release agent alone.

It is yet another object of this invention to provide a more cost-effective peroxyacid bleach-containing laundry product in which part of the expensive peroxyacid bleach is replaced by a less costly soil release agent and yet providing
45 a product having equal or superior overall bleaching/cleaning performance to one with higher levels of bleach.

These and other objects of this invention will become apparent in the light of the following disclosure.

SUMMARY OF THE INVENTION

50 The present invention relates to a laundry composition comprising effective amounts of a peroxyacid bleach and a soil release agent characterized in that said composition comprises an alkalinity source and wherein said soil release agent is selected from:

55 A. alkyl and hydroxyalkyl ethers of cellulose containing from one to four carbon atoms in the alkyl moiety and having a molar degree of substitution of from 1.5 to 2.7 and a number average molecular weight of from 2,000 to 100,000;

B. polymers comprising ethylene terephthalate and polyethylene oxide terephthalate at a mole ratio of from 1:10

to 10:1, said polyethylene oxide terephthalate containing polyethylene oxide units with a number average molecular weight of from 500 to 10,000, and said soil release agent having a number average molecular weight of from 1,000 to 100,000;

5 C. polymers comprising propylene terephthalate and polyethylene oxide terephthalate at a mole ratio of from 1:10 to 10:1, said polyethylene oxide terephthalate containing polyethylene oxide units with a number average molecular weight of from 500 to 10,000, and said soil release agent having a number average molecular weight of from 1,000 to 100,000; and

10 D. polymers comprising ethylene terephthalate and/or propylene terephthalate in any ratio and polyethylene oxide and/or polypropylene oxide in any ratio such that the mole ratio of ethylene terephthalate plus propylene terephthalate to polyethylene oxide plus polypropylene oxide is from 1:10 to 10:1, said polyethylene oxide units and said polypropylene oxide units each having a number average molecular weight of from 250 to 10,000, and said soil release agent having a number average molecular weight of from 1,000 to 100,000;

15

and mixtures thereof;

wherein the weight ratio of available oxygen (AvO) in said peroxyacid bleach to the soil release agent lies in the range from 10:1 to 1:10.

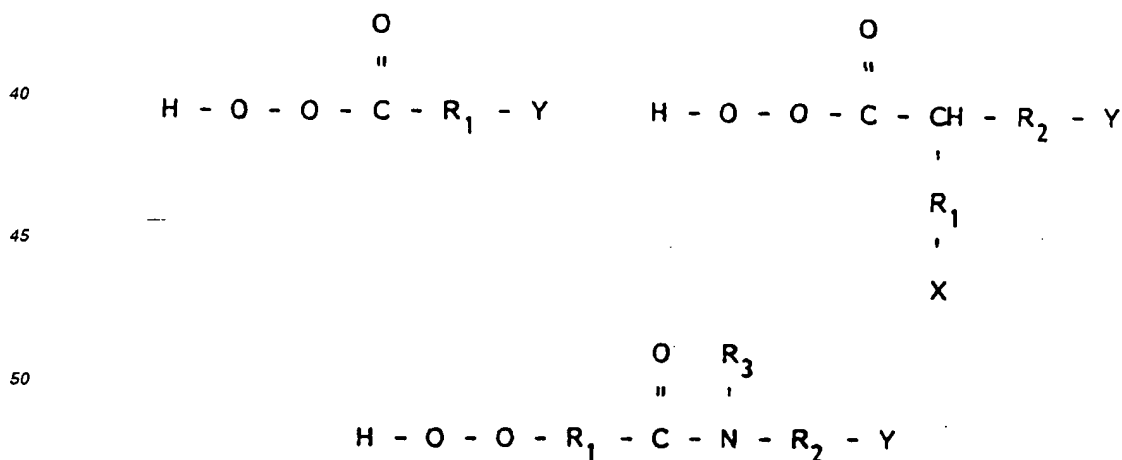
20 DETAILED DESCRIPTION OF THE INVENTION

The present invention provides an unexpectedly superior laundry cleaning composition comprising effective amounts of a peroxyacid bleach and a soil release agent. The peroxyacid and the soil release agent are present at a ratio of weight of available oxygen to weight of soil release agent of from 10:1 to 1:10, more preferably from 5:1 to 1:5, and presently most preferably from 2:1 to 1:2. The present invention can be incorporated into a fully formulated, stand alone product, or it can be formulated as an additive to be used in combination with a laundry detergent. It is preferably a dry composition, but can be in whole or in part a liquid or paste.

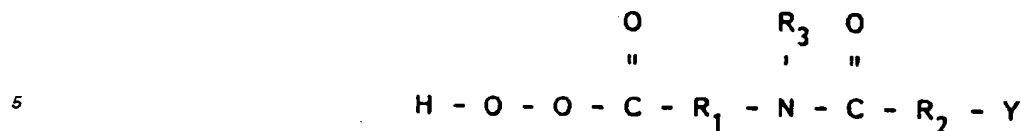
The peroxyacid can be a preformed peroxyacid or it can be a combination of an inorganic persalt (e.g., sodium perborate) and an organic peroxyacid precursor which is converted to a peroxyacid when the combination of persalt and precursor is dissolved in water. The organic peroxyacid precursors are often referred to in the art as bleach activators.

Examples of suitable organic peroxyacids are disclosed in U.S. Pat. No. 4,374,035, F.P. Bossu, issued Feb. 15, 1983. Examples of compositions suitable for laundry bleaching which contain preferred activated perborate bleaches are disclosed in U.S. Pat. No. 4,412,934, Chung and Spadini, issued Nov. 1, 1983.

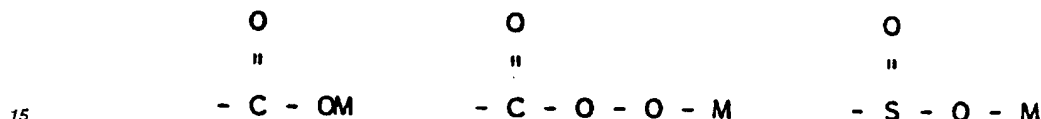
35 The preferred organic peroxyacid is selected from the following:



55



wherein R₁ and R₂ are alkylene groups containing from 1 to 20 carbon atoms or phenylene groups, R₃ is hydrogen or an alkyl, aryl, or alkaryl group containing from about 1 to 10 carbon atoms, and X and Y are hydrogen, halogen, alkyl, aryl, or any group which provides an anionic moiety in aqueous solution. Such X and Y groups can include, for example,



where M is hydrogen or a water-soluble salt-forming cation. Mixtures of peroxyacids can be used.

Specific examples of preferred peroxyacids for this invention include diperoxydodecanedioic acid (DPDA), nonylamide of peroxysuccinic acid (NAPSA), decyldiperoxysuccinic acid (DDPSA). For the purpose of this invention, the peroxyacid is preferably incorporated into a soluble granule according to the method described in U.S. Pat. No. 4,374,035, *supra*.

The peroxyacid bleach is used at a level which provides an amount of available oxygen (AvO) from 0.10% to 10%, preferably from 0.5% to 5%, and most preferably from 1% to 4%. A preferred bleach granule comprises 1% to 50% of an exotherm control agent (e.g., boric acid); 1% to 25% of a peroxyacid compatible surfactant (e.g., C₁₃LAS); 0.1% to 10% of one or more chelant stabilizers (e.g., sodium pyrophosphates); and 10% to 50% of a water-soluble processing salt (e.g., Na₂SO₄).

Alternatively, the composition may contain a suitable organic precursor which generates one of the above peroxyacids when reacted with alkaline hydrogen peroxide in aqueous solution. The source of hydrogen peroxide can be any inorganic peroxygen compound which dissolves in aqueous solution to generate hydrogen peroxide, e.g., sodium perborate (monohydrate and tetrahydrate) and sodium percarbonate.

These compositions comprise:

- (a) a peroxygen bleaching compound capable of yielding hydrogen peroxide in an aqueous solution; and
- (b) a bleach activator having the general formula:



wherein R is an alkyl group containing from 5 to 18 carbon atoms wherein the longest linear alkyl chain extending from and including the carbonyl carbon contains from 6 to 10 carbon atoms and L is a leaving group, the conjugate acid of which has a pK_a in the range of from 6 to 13.

Preferred compositions comprise an effective amount of soil release agent and peroxyacid bleach precursor and peroxygen bleaching compound to work in the wash solution. The peroxygen bleaching compound to soil release agent ratios are 30:1 to 1:10; preferably 15:1 to 1:5; and 3:1 to 1:2 on an AvO weight to soil release agent weight basis.

Certain cellulose ethers and terephthalate ester/ethylene oxide copolymers are known to provide soil release benefits. While not being bound to any theory, it is believed that they do this by adsorbing onto fabrics, particularly synthetic fabrics such as polyester, such that stains, particularly greasy stains, subsequently transferred to the fabric are more easily removed in the next wash cycle.

According to the invention, the soil release agent is selected from the following:

A. alkyl and hydroxyalkyl ethers of cellulose containing from one to four carbon atoms in the alkyl or hydroxyalkyl moiety and having a molar degree of substitution of from 1.5 to 2.7 and a number average molecular weight of from 2,000 to 100,000;

B. polymers comprising ethylene terephthalate and polyethylene oxide terephthalate at mole ratio from 1:10 to 10:1, said polyethylene oxide terephthalate containing polyethylene oxide units with a number average molecular weight from 500 to 10,000, and said soil release agent having a number average molecular weight of from 1,000

to 100,000;

C. polymers comprising propylene terephthalate and polyethylene oxide terephthalate at a mole ratio from 1:10 to 10:1, said polyethylene oxide terephthalate containing polyethylene oxide units with a number average molecular weight from 500 to 10,000, and said soil release agent having a number average molecular weight of from 1,000 to 100,000;

D. polymers comprising ethylene terephthalate and/or propylene terephthalate in any ratio and polyethylene oxide and/or polypropylene oxide in any ratio such that the mole ratio of ethylene terephthalate plus propylene terephthalate to polyethylene oxide plus propylene oxide is from 1:10 to 10:1, said polyethylene oxide units and said polypropylene oxide units each having a number average molecular weight from 250 to 10,000, and said soil release agent having a number average molecular weight of from 1,000 to 100,000.

Any combination of the above soil release agents can be used.

It is an essential aspect of the present invention that the soil release agent be formulated and delivered in a manner that provides adsorption of this active to hydrophobic synthetic fabrics during the laundry process. Ideally the polymer is delivered in such a way and at levels which provide essentially the maximum soil release effect after a single wash-rinse-dry cycle. That is, essentially the full soil release advantage can be observed in the second washing of any particular garment.

It is intended that the scope of the present invention encompasses products and laundering methods in which the bleach component is released entirely in the wash and the soil release agent component is released entirely or partially in the wash cycle, in the rinse cycle, or in the drying cycle, including partial delivery of the soil release agent in each of the different cycles.

Wash Cycle Delivery

When most or all of the soil release agent is delivered in the wash cycle, the efficiency of deposition on fabric and consequent soil release performance is dependent on the selection of soil release agent, detergent builder and surfactant actives. U.S. Pat. No. 4,000,093, *supra*, discloses cellulose-based soil release agents suitable for use in combination with detergent compositions. The preferred surfactants are the C₁₀-C₁₃ alkyl sulfate surfactants which are substantially free from interfering amounts of longer-chain length alkyl sulfates. U.S. Pat. No. 4,116,885, *supra*, discloses polyester/polyether soil release agents used with only limited amounts of incompatible anionic surfactants.

In a different approach, U.S. Pat. No. 4,020,015, G. Bevan, issued Apr. 26, 1977, teaches that a variety of soil release agents show enhanced performance in dry granular detergents when the soil release agent is incorporated as a separate granular extrudate consisting of the soil release agent and an extrudable organic carrier. The latter approach has been found to be useful for formulating a soil release agent for the current invention. For example methylcellulose soil release agents such as those sold by Dow Chemical Co. under the trade name Methocel[®] can be blended in a 1:1 ratio with polyethylene glycol (e.g., tradename, Carbowax PEG 3350) and the resultant blend extruded on a radial extruder and ground to the desired particle size. The resultant granular extrudates are rapidly soluble and provide excellent soil release performance when delivered to the wash cycle with a variety of different detergent formulations.

Rinse Cycle Delivery

Enhanced soil release performance can be achieved for a variety of soil release agents by delivering them into the rinse cycle instead of the wash cycle. In particular, polyester/polyether soil release agents which are highly sensitive to interference by anionic surfactants in the wash can be used much more effectively with anionic detergents by rinse cycle delivery. Examples of suitable soil release agents for use in the rinse cycle in the context of the present invention include ethyleneterephthalate/ethyleneoxide copolymers sold by DuPont under the Zelcon trade name and by ICI under the Milease trade name. These materials can be delivered to the rinse cycle as aqueous dispersions or as rapidly dispersing granules or powders. An example of the latter form can be made by taking a suitable Zelcon material in the pure solid form, heating it to its softening point, and blending it with an equal mass of urea such that the urea and polymer are uniformly distributed. The resultant mass is cooled to a hard solid and ground to the desired granule size. The resultant granules disperse rapidly in a cold water rinse solution and provide excellent soil release performance.

In cases where it is particularly desirable to add the soil release agent in the rinse cycle, the soil release agent component is preferably incorporated into a single product also containing the peroxyacid bleach in such a way that the bleach is released in the wash cycle and the soil release agent is released in the rinse cycle of an automatic washing machine. There are several laundry product designs which can be used to effect such a sequential release delivery of actives. For example, U.S. Pat. No. 4,108,600, Wong, issued Aug. 22, 1978, describes fabric conditioning articles which release an electrolyte or pH control agent in the wash, the effect of which is to render insoluble in the wash a coating agent surrounding and protecting the active (i.e., soil release agent of the present invention) to be delivered in the

rinse cycle. In a preferred embodiment the article consists of a porous outer pouch of spunbonded polyester which contains sodium borate and an inner nonporous film pouch of a polyvinyl alcohol which is rendered insoluble by the sodium borate in the wash solution and contains within it soil release agent to be delivered in the rinse cycle. For the purpose of the present invention, the article is made to contain peroxyacid bleach and, optionally, detergent in addition to sodium borate in the outer pouch, and soil release agent granules in the inner pouch. A product made in such a way releases the peroxyacid and detergent components at the beginning of the wash cycle and releases the soil release agent component in the rinse cycle.

Other patents, which describe potentially useful product designs for automatic release of actives in the rinse cycle include: Canadian Pat. No. 1,133,712, Bristol-Myers Co., issued Oct. 19, 1982; U.S. Pat. Nos. 4,304,562, Bolan et al., issued Dec. 8, 1981; and 4,588,080, Ginn et al., issued May 13, 1986.

Optionals

If the present invention is used in combination with a pouch, a bag, or the like, preferred pouch substrates are set out in the examples. Suitable substrates are also taught in U.S. Pat. No. 4,113,630, supra, and 4,108,600, supra, and U.S. Ser. Nos. 675,804, filed Nov. 28, 1984; and 748,654, filed June 25, 1985. It is advantageous to include a substrate which contains or supports the active ingredients in a premeasured, single use amount and releases them at the desired point in the wash and/or rinse cycle. The substrate may also be used to separate or compartmentalize incompatible ingredients until they are released into the wash solution. As described above, a specially designed substrate may be particularly useful to effect a sequenced delivery in which the detergent and bleach ingredients are released in the wash cycle and the soil release agent is released in the late wash and/or rinse cycle. The substrate can take almost any physical form including pouches, sheets, webs, sponges, cups, etc. It may consist of nondissolving, partially dissolving or fully dissolving material, or combinations thereof. An example of a particularly useful substrate for the present invention is a two-ply multipouched laminated article disclosed in allowed U.S. Application Ser. No. 675,804, W.T. Bedenk and K.L. Harden, filed Nov. 28, 1984, for which the European equivalent is EP-A-184261.

The present invention is preferably used as part of a fully formulated stand-alone detergent product wherein appropriate detergent components are present and released along with the peroxyacid bleach, soil release agent and alkalinity source. Useful detergent compositions for use with this invention can include essentially any typical laundry detergent containing one or more types of organic surfactant along with detergency adjunct materials. The organic surfactant is selected from the group consisting of anionic, nonionic, ampholytic and zwitterionic surfactants, and mixtures thereof. U.S. Pat. 3,664,961, Norris, issued May 23, 1972, describes at Col. 1, line 68, to Col. 9, line 3, suitable surfactants useful herein. The anionic and nonionic surfactants are preferred. Nonlimiting examples of adjunct materials which can be used in the detergent composition include soil suspending agents, perfumes, optical bleaches, processing aids and enzymes. Nonlimiting examples of powdered detergent materials suitable for use with the present invention are disclosed in U.S. Pat. No. 4,404,128, B.J. Anderson, issued Sept. 13, 1983.

Fabric softeners can also be used in combination with the components of the present invention. A preferred softener is a particle formulated to survive (i.e., not dissolve in) the wash and rinse cycle, and melt and become distributed evenly on the fabric in the dryer cycle. The softener particle composition wash water survival should be at least 25%, preferably at least 40% by weight. Numerous examples of softener/antistat compositions which function in this manner are taught in the literature, e.g., U.S. Pat. Nos. 4,113,630, Hagner et al., issued Sept. 12, 1978, and 4,108,600, supra.

Granule Containing Soil Release Agent

A granule containing methylcellulose soil release agent which dissolves rapidly under laundry wash cycle conditions is made according to the following procedure:

Methylcellulose powder (182 kg (400 lbs.) of Dow Methocel (tradename) A-15LV Premium Grade) and polyethylene glycol (182 kg (400 lbs.) of Union Carbide Carbowax (tradename) PEG 3350) are blended in a rotating drum mixer for 5 minutes. The blended material is then divided into four 200 L (55 gal.) fiber drums which are stored at 49°C (120°F) for 36 hours. The powder blend is then fed by hand into a radial extruder (Fuji Pandal (tradename) Model EXDCS-100). The temperature of the material entering the extruder is ca 38°C (100°F). The resulting extrudate is recycled once through the extruder. After allowing the extrudate to cool to room temperature it is run through a Fitzmill, Model DA506 (tradename), using a 1.41 mm screen. The resultant material is sieved on a Rotex using a 0.32 mm screen to remove fine particles.

Nonwoven Fabric

A nonwoven fabric is coated with soil release agent according to the following procedure:

450 ml of distilled water are added to a 2000 ml stainless steel beaker and heated to 70°C (158°F). 80 grams of

Dow Chemical's Methocel A-15LV (tradename) Premium Grade methylcellulose are slowly added to the water under good agitation conditions (a vortex was present). After the methylcellulose is well dispersed, the agitation is reduced to prevent aeration. 438 grams of 20°C (68°F) water are then added to the dispersion. Propylene glycol (32.0g) is then added. The beaker is then placed in an ice bath and agitation continued until product became clear (an indication that the methylcellulose was dissolved). An 11.4 cm x 28 cm (4.5 in. x 11 in.) sheet of DuPont Reemay 2420 (tradename, a spunbonded, 63 g/m², 0.44 Tex polyester fabric) was immersed in the methylcellulose solution. The saturated fabric was then run through an Atlas Electric Devices Co. laboratory wringer (Model LW-1) set at approximately 50 kg (110 lbs.) force. The wrung-out fabric is then line dried in a low humidity environment for 24 hours. The substrate is coated with about 0.75 g (0.028 oz.) of solid coating.

Bleach Granule

A bleach granule having the composition detailed below is prepared using the procedure described in Example 1 of U.S. Pat. No. 4,374,035, supra.

Ingredient	Wt. %
Diperoxidodecanedioic acid	24.0
Dodecandioic acid	2.9
Sodium C ₁₃ linear alkylbenzene sulfonate	5.5
Boric acid	27.7
Sodium sulfate	39.7
Miscellaneous	0.2
Total	100.0

Granular Detergent Composition

The following granular detergent composition is prepared.

	Base Granules	
	Weight %	Grams Final Composition Per Use
5		
	Sodium C ₁₃ linear alkyl- benzene sulfonate	22.1 5.110
10	Sodium C ₁₄₋₁₅ alkyl sulfate	22.1 5.110
	Sodium silicate (1.6 ratio)	13.7 3.172
	Sodium sulfate	32.2 7.455
15	Polyethylene glycol (MW = 8000)	1.5 0.340
	Sodium polyacrylate (MW = 4500)	2.0 0.453
20	C ₁₂₋₁₃ alcohol poly- ethoxylate (6)	3.0 0.680
	Sodium diethylenetriamine pentaacetate	1.5 0.340
25	Moisture	2.0 0.462
		23.122
30	<u>Preblend</u>	
	Base granules	23.122
	Sodium tripolyphosphate hexahydrate (powdered)	20.576
35		43.698
	<u>Admix</u>	
40	Preblend	43.698
	Sodium tripolyphosphate (STP) hexahydrate (granular)	19.429
	Dye	0.003
45	Brightener	0.613
	Suds suppressor prill comprising dimethylsilicone, silica, sodium tripolyphosphate and polyethylene glycol (MW = 8000)	1.703
50		
55		

	Base Granules	
	Weight %	Grams Final Composition Per Use
Protease		2.044
Sodium carbonate		4.000
		<u>71.490</u>
<u>Spray-On</u>		
Admix		71.490
Mineral oil		0.710
		<u>72.200</u>

The base granules are produced by spray-drying an aqueous crutcher mix of the components on a ten foot tower using a crutcher temperature of 93°C a size 3-1/2 nozzle to make fine granules, and silicone deaerants. If a second drying stage on a continuous fluid bed is used to reduce moisture to 2%.

The base granules are then admixed with powdered STP hexahydrate to form the preblend. The preblend is compacted at 345 kPa roll pressure on a 102 mm by 254 mm chilsonator, and screened to select a -14(1168 microns)/+65 (208 microns) particle size cut (Tyler mesh). Oversized particles are collected and granulated on a Fitzmill, Model DA506 (tradename, The Fitzpatrick Company, Elmhurst, Illinois 60126), using a 1.4 mm screen and low rev/min. This is screened to select a -20(833 µm)/+48(295 µm) particle size cut. Both materials are dedusted by blowing off fines in a fluid bed dryer using ambient air.

The admix is prepared as a 181.4 kg batch in a drum mixer. Carbonate, granular STP (with dye sprayed-on), brightener, enzymes, and suds suppressor pills are blended with the compacted mainstream product cut and reggranulated overs at a ratio of mainstream product cut to overs of about 7 to 1. Mineral oil is sprayed on the final admix in 13.5 to 18 kg batches at a 1% level using a Forberg Mixer (tradename).

Multi-pouched laundry cleaning article

A preferred mode multipouched laundry cleaning article consisting of the soil release agent coated nonwoven substrate hereinbefore described and containing the detergent and bleach granular compositions also hereinbefore described is made using the following procedure. A 11.4 cm x 28 cm (4.5 in. x 11 in.) sheet of DuPont Reemay 2420 (a spunbonded, 63 g/m², 4.4 dtex (4 denier) polyester fabric) is embossed or stretched to form a single roll of 6 cells similar to the pattern shown in Figs. 7 and 8 of U.S. Pat. No. 4,571,924, A.S. Bahrani, issued Feb. 25, 1986.

The six cups are embossed to a depth of approximately 1.0 cm (0.4 in.), and heat set. Each cup is approximately 3.6 cm. (1.4 in.) wide and approximately 9.8 cm. (3.8 in.) in length, each with about 30 cc capacity. Two cups are each filled with approximately 14 grams (0.50 oz.) of the granular bleach composition hereinbefore described. Each of the eight cups is filled with approximately 18 grams (0.64 oz.) of the granular detergent composition hereinbefore described. A topsheet ply of the same dimensions and material as used for the embossed sheet is then attached to the filled, embossed ply by heat sealing with a sheet of polyethylene patterned to correspond to the rims of embossed ply. The nonwoven substrate is coated with methylcellulose soil release agent according to the method described in the previous section headed, 'nonwoven fabric' such that the total level of methylcellulose in the article is 1.1g. The AvO to soil release agent ratio for this article is 1:1.25 and the product delivers 12 ppm AvO and 16 ppm of soil release agent in a 68 liter wash solution.

A multipouched laundry cleaning article is made according to the method hereinbefore described with the addition of 0.54 gram of the soil release agent granules hereinbefore described added to each of the four detergent pouches with a noncoated substrate. The total amount of soil release agent active is 1.1 grams, thus the AvO to soil release agent ratio for this article is 1:1.3.

The present invention will be further understood by reference to the following non-limiting example.

Example

(a) A preferred fabric softener (core) particle has the following formula:

Ingredient		Wt. %
Ditalowdimethylammonium methylsulfate (DTDMAMS)		42.4
Sorbitan monostearate		21.3
Cetyl alcohol		21.3
Bentonite clay		12.0
Perfume		3.0
	Total	100.0

The softener core particles are coated with stearyl alcohol in an amount such that the stearyl alcohol comprises 11% of the total particle composition (i.e., core plus coating).

The coated particles can be used "as is" as softener particles with or without detergent granules. They can be overcoated with a hard shell of ethyl cellulose, e.g., Ethocel Std. 4, (Tradename, Dow Chemical Co., Midland, Michigan 48640). The amount of ethyl cellulose solids overcoated onto the particles is about 3% by weight of the total particle weight. The softener particles are sized through 0.595 mm to 1.68 mm screens.

(b) A granular composition in accord with the invention is prepared by mixing the above ethyl cellulose overcoated softener particles with 96 parts of the following granular bleach composition.

Ingredient		Wt. %
Diperoxidodecanedioic acid		24.0
Dodecandioic acid		2.9
Sodium C ₁₃ linear alkylbenzene sulfonate		5.5
Boric acid		27.7
Sodium sulfate		39.7
Miscellaneous		0.2
	Total	100.0

Claims

1. A laundry composition comprising effective amounts of a peroxyacid bleach and a soil release agent characterized in that said composition comprises an alkalinity source and wherein said soil release agent is selected from:

A. alkyl and hydroxyalkyl ethers of cellulose containing from one to four carbon atoms in the alkyl moiety and having a molar degree of substitution of from 1.5 to 2.7 and a number average molecular weight of from 2,000 to 100,000;

B. polymers comprising ethylene terephthalate and polyethylene oxide terephthalate at a mole ratio of from 1:10 to 10:1, said polyethylene oxide terephthalate containing polyethylene oxide units with a number average molecular weight of from 500 to 10,000, and said soil release agent having a number average molecular weight of from 1,000 to 100,000;

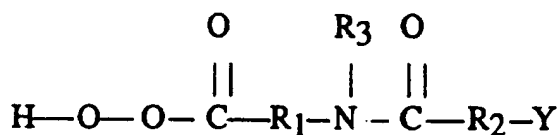
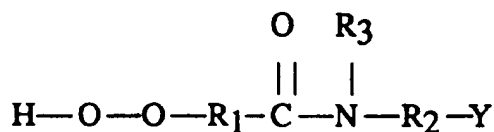
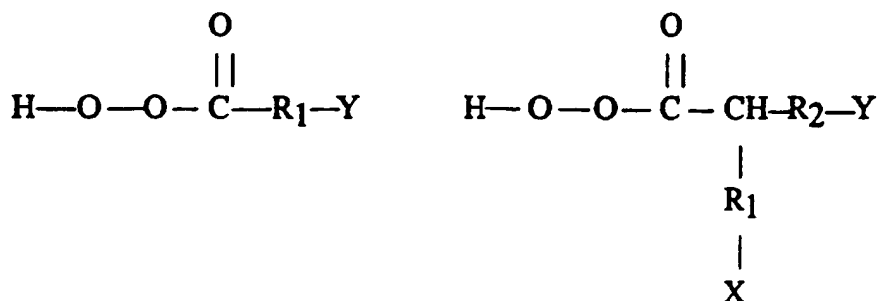
C. polymers comprising propylene terephthalate and polyethylene oxide terephthalate at a mole ratio of from 1:10 to 10:1, said polyethylene oxide terephthalate containing polyethylene oxide units with a number average molecular weight of from 500 to 10,000, and said soil release agent having a number average molecular weight of from 1,000 to 100,000; and

D. polymers comprising ethylene terephthalate and/or propylene terephthalate in any ratio and polyethylene oxide and/or polypropylene oxide in any ratio such that the mole ratio of ethylene terephthalate plus propylene terephthalate to polyethylene oxide plus polypropylene oxide is from 1:10 to 10:1, said polyethylene oxide units and said polypropylene oxide units each having a number average molecular weight of from 250 to 10,000, and said soil release agent having a number average molecular weight of from 1,000 to 100,000;

and mixtures thereof;

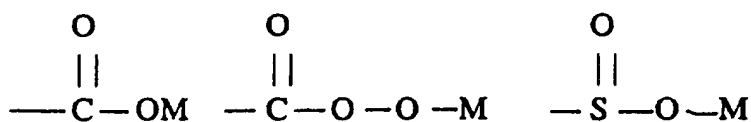
wherein the weight ratio of available oxygen (AvO) in said peroxyacid bleach to the soil release agent lies in the range from 10:1 to 1:10.

2. A composition according to Claim 1 wherein said composition is a dry composition.
3. A composition according to either of Claims 1 or 2 wherein the weight ratio of available oxygen (AvO) in said peroxyacid bleach to the soil release agent lies in the range from 5:1 to 1:5.
4. A composition according to Claim 3 wherein said weight ratio is from 2:1 to 1:2.
5. A composition according to any one of claims 1-4 wherein said peroxyacid bleach is selected from:



wherein R_1 and R_2 are alkylene groups containing from 1 to 20 carbon atoms or phenylene groups, R_3 is hydrogen or an alkyl, aryl, or alkaryl group containing from 1 to 10 carbon atoms, and X and Y are selected from hydrogen, halogen, alkyl, aryl, or any group which provides an anionic moiety in aqueous solution.

6. A composition according to Claim 5 wherein X and/or Y are selected from:



where M is hydrogen or a water-soluble salt-forming cation.

7. A composition according to any one of claims 1-6 wherein said soil release agent is a methylcellulose polymer and said peroxyacid bleach is diperoxydodecanedioic acid.
8. A composition according to any one of claims 1-7 wherein said composition is part of a through-the-wash article, and wherein said peroxyacid bleach and said soil release agent are enclosed in a pouch made from a water-permeable, but water-insoluble, substrate material.
9. A laundry composition comprising an effective amount of a soil release agent and an organic peroxyacid bleach precursor and a peroxygen bleaching compound capable of yielding hydrogen peroxide in an aqueous solution such that an effective amount of peroxyacid is thereby generated characterized in that said composition comprises an alkalinity source and wherein soil release agent is selected from:

A. alkyl and hydroxyalkyl ethers of cellulose containing from one to four carbon atoms in the alkyl moiety and having a molar degree of substitution of from 1.5 to 2.7 and a number average molecular weight of from 2,000 to 100,000.

5 B. polymers comprising ethylene terephthalate and polyethylene oxide terephthalate at a mole ratio of from 1:10 to 10:1, said polyethylene oxide terephthalate containing polyethylene oxide units with a number average molecular weight of from 500 to 10,000 and said soil release agent having a number average molecular weight of from 1,000 to 100,000;

10 C. polymers comprising propylene terephthalate and polyethylene oxide terephthalate at a mole ratio of from 1:10 to 10:1, said polyethylene oxide terephthalate containing polyethylene oxide units with a number average molecular weight of from 500 to 10,000, and said soil release agent having a number average molecular weight of from 1,000 to 100,000; and

15 D. polymers comprising ethylene terephthalate and/or propylene terephthalate in any ratio and polyethylene oxide and/or polypropylene oxide in any ratio such that the mole ratio of ethylene terephthalate plus propylene terephthalate to polyethylene oxide plus polypropylene oxide is from 1:10 to 10:1, said polyethylene oxide units and said polypropylene oxide units each having a number average molecular weight of from 250 to 10,000, and said soil release agent having a number average molecular weight of from 1,000 to 100,000;

20 and mixtures thereof;

wherein the peroxygen bleaching compound and the soil release agent are present at a ratio of from 30:1 to 1:10 on an available oxygen of the peroxygen bleaching compound to soil release agent weight basis.

25 10. A composition according to Claim 9 wherein said composition is a dry composition.

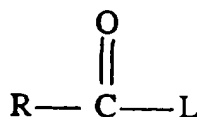
11. A composition according to either of Claim 9 or 10 wherein said ratio is from 15:1 to 1:2.

12. A composition according to Claim 11 wherein said ratio is from 3:1 to 1:2.

30 13. A composition according to any one of claims 9 - 12 wherein the peroxyacid-generating composition comprises:

(a) a peroxygen bleaching compound capable of yielding hydrogen peroxide in a aqueous solution; and

35 (b) a bleach activator having the general formula:



40 wherein R is an alkyl group containing from 5 to 18 carbon atoms wherein the longest linear alkyl chain extending from and including the carbonyl carbon contains from 6 to 10 carbon atoms and L is a leaving group, the conjugate acid of which has a pKa in the range of from 6 to 13.

45 Patentansprüche

50 1. Zusammensetzung zum Wäschewaschen, umfassend wirksame Mengen eines Peroxysäurebleichmittels und eines Schmutzlösemittels, dadurch gekennzeichnet, daß die genannte Zusammensetzung eine Alkalinitäts-Quelle umfaßt und das genannte Schmutzlösemittel unter:

A. Cellulosealkyl- und -hydroxyalkylethern mit 1 bis 4 Kohlenstoffatomen im Alkylrest und einem molaren Substitutionsgrad von 1,5 bis 2,7 und einem Zahlenmittel-Molekulargewicht von 2.000 bis 100.000;

55 B. Polymeren, welche Ethylenterephthalat und Polyethylenoxidterephthalat in einem Molverhältnis von 1:10 bis 10:1 umfassen, welches Polyethylenoxidterephthalat Polyethylenoxideinheiten mit einem Zahlenmittel-Molekulargewicht von 500 bis 10.000 enthält und welches Schmutzlösemittel ein Zahlenmittel-Molekularge-

wicht von 1.000 bis 100.000 aufweist;

C. Polymeren, welche Propylenterephthalat und Polyethylenoxidterephthalat in einem Molverhältnis von 1:10 bis 10:1 umfassen, welches Polyethylenoxidterephthalat Polyethylenoxideinheiten mit einem Zahlenmittel-Molekulargewicht von 500 bis 10.000 enthält und welches Schmutzlösemittel ein Zahlenmittel-Molekulargewicht von 1.000 bis 100.000 aufweist; und

D. Polymeren, welche Ethylenterephthalat und/oder Propylenterephthalat in jedem beliebigen Verhältnis und Polyethylenoxid und/oder Polypropylenoxid in jedem beliebigen Verhältnis umfassen, sodaß das Molverhältnis von Ethylenterephthalat plus Propylenterephthalat zu Polyethylenoxid plus Polypropylenoxid von 1:10 bis 10:1 beträgt, welche Polyethylenoxideinheiten und welche Polypropylenoxideinheiten jeweils ein Zahlenmittel-Molekulargewicht von 250 bis 10.000 aufweisen und welches Schmutzlösemittel ein Zahlenmittel-Molekulargewicht von 1.000 bis 100.000 besitzt;

und unter Gemischen hievon ausgewählt ist;

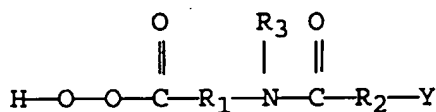
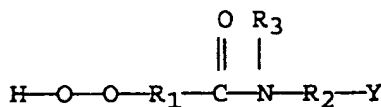
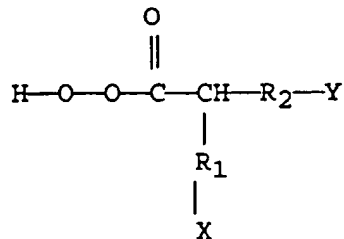
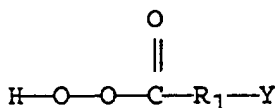
wobei das Gewichtsverhältnis von dem verfügbaren Sauerstoff (AvO) im genannten Peroxysäurebleichmittel zu dem Schmutzlösemittel im Bereich von 10:1 bis 1:10 liegt.

2. Zusammensetzung nach Anspruch 1, wobei die genannte Zusammensetzung eine trockene Zusammensetzung ist.

3. Zusammensetzung nach Anspruch 1 oder 2, wobei das Gewichtsverhältnis von dem verfügbaren Sauerstoff (AvO) im genannten Peroxysäurebleichmittel zu dem Schmutzlösemittel im Bereich von 5:1 bis 1:5 liegt.

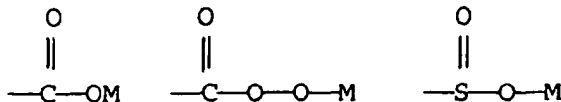
4. Zusammensetzung nach Anspruch 3, wobei das genannte Gewichtsverhältnis von 2:1 bis 1:2 beträgt.

5. Zusammensetzung nach einem der Ansprüche 1 bis 4, wobei das genannte Peroxysäurebleichmittel unter



ausgewählt ist, wobei R_1 und R_2 Alkylengruppen mit 1 bis 20 Kohlenstoffatomen oder Phenylengruppen sind, R_3 für Wasserstoff oder eine Alkyl-, Aryl- oder Alkarylgruppe mit 1 bis 10 Kohlenstoffatomen steht, und X und Y unter Wasserstoff, Halogen, Alkyl, Aryl oder jeder beliebigen Gruppe, welche in wäßriger Lösung einen anionischen Rest gewährleistet, ausgewählt sind.

6. Zusammensetzung nach Anspruch 5, wobei X und/oder Y unter



ausgewählt sind, wobei M Wasserstoff oder ein wasserlösliches salzbildendes Kation darstellt.

7. Zusammensetzung nach einem der Ansprüche 1 bis 6, wobei das genannte Schmutzlösemittel ein Methylcellulosepolymer ist und das genannte Peroxysäurebleichmittel Diperoxydodecandisäure ist.
8. Zusammensetzung nach einem der Ansprüche 1 bis 7, wobei die genannte Zusammensetzung Teil eines während des Waschens anzuwendenden Erzeugnisses ist, und wobei das genannte Peroxysäurebleichmittel und das genannte Schmutzlösemittel in einem aus einem wasserdurchlässigen, aber wasserunlöslichen, Substratmaterial hergestellten Beutel eingeschlossen sind.
9. Zusammensetzung zum Wäschewaschen, umfassend eine wirksame Menge eines Schmutzlösemittels und eines organischen Peroxysäurebleichmittelprecursors und einer Persauerstoffbleichmittelverbindung, welche fähig ist, in einer wäßrigen Lösung Wasserstoffperoxid zu liefern, sodaß dadurch eine wirksame Menge an Peroxysäure gebildet wird, dadurch gekennzeichnet, daß die genannte Zusammensetzung eine Alkalitätsquelle umfaßt und das Schmutzlösemittel unter
- A. Cellulosealkyl- und -hydroxyalkylethern mit 1 bis 4 Kohlenstoffatomen im Alkylrest und einem molaren Substitutionsgrad von 1,5 bis 2,7 und einem Zahlenmittel-Molekulargewicht von 2.000 bis 100.000;
- B. Polymeren, welche Ethylenterephthalat und Polyethylenoxidterephthalat in einem Molverhältnis von 1:10 bis 10:1 umfassen, welches Polyethylenoxidterephthalat Polyethylenoxideinheiten mit einem Zahlenmittel-Molekulargewicht von 500 bis 10.000 enthält und welches Schmutzlösemittel ein Zahlenmittel-Molekulargewicht von 1.000 bis 100.000 aufweist;
- C. Polymeren, welche Propylenterephthalat und Polyethylenoxidterephthalat in einem Molverhältnis von 1:10 bis 10:1 umfassen, welches Polyethylenoxidterephthalat Polyethylenoxideinheiten mit einem Zahlenmittel-Molekulargewicht von 500 bis 10.000 enthält und welches Schmutzlösemittel ein Zahlenmittel-Molekulargewicht von 1.000 bis 100.000 aufweist; und
- D. Polymeren, welche Ethylenterephthalat und/oder Propylenterephthalat in jedem beliebigen Verhältnis und Polyethylenoxid und/oder Polypropylenoxid in jedem beliebigen Verhältnis umfassen, sodaß das Molverhältnis von Ethylenterephthalat plus Propylenterephthalat zu Polyethylenoxid plus Polypropylenoxid von 1:10 bis 10:1 beträgt, welche Polyethylenoxideinheiten und welche Polypropylenoxideinheiten jeweils ein Zahlenmittel-Molekulargewicht von 250 bis 10.000 aufweisen und welches Schmutzlösemittel ein Zahlenmittel-Molekulargewicht von 1.000 bis 100.000 besitzt;
- und unter Gemischen hievon ausgewählt ist;
- wobei die Persauerstoffbleichmittelverbindung und das Schmutzlösemittel in einem Gewichtsverhältnis von 30:1 bis 1:10 von dem verfügbaren Sauerstoff in der Persauerstoffbleichmittelverbindung zu dem Schmutzlösemittel vorhanden sind.
10. Zusammensetzung nach Anspruch 9, wobei die genannte Zusammensetzung eine trockene Zusammensetzung ist.
11. Zusammensetzung nach Anspruch 9 oder 10, wobei das genannte Verhältnis von 15:1 bis 1:2 beträgt.
12. Zusammensetzung nach Anspruch 11, wobei das genannte Verhältnis von 3:1 bis 1:2 beträgt.
13. Zusammensetzung nach einem der Ansprüche 9 bis 12, wobei die Peroxysäure-bildende Zusammensetzung
- a) eine Persauerstoffbleichmittelverbindung, welche fähig ist, in einer wäßrigen Lösung Wasserstoffperoxid zu liefern; und
- b) einen Bleichmittelaktivator der allgemeinen Formel:
- $$\begin{array}{c} \text{O} \\ || \\ \text{R}-\text{C}-\text{L} \end{array}$$
- umfaßt, wobei R eine Alkylgruppe mit 5 bis 18 Kohlenstoffatomen ist, worin die längste sich vom Carbonylkohlenstoff erstreckende und diesen einschließende, lineare Alkylkette 6 bis 10 Kohlenstoffatome enthält, und L eine Leaving-Gruppe darstellt, deren konjugierte Säure einen pKa-Wert im Bereich von 6 bis 13 aufweist.

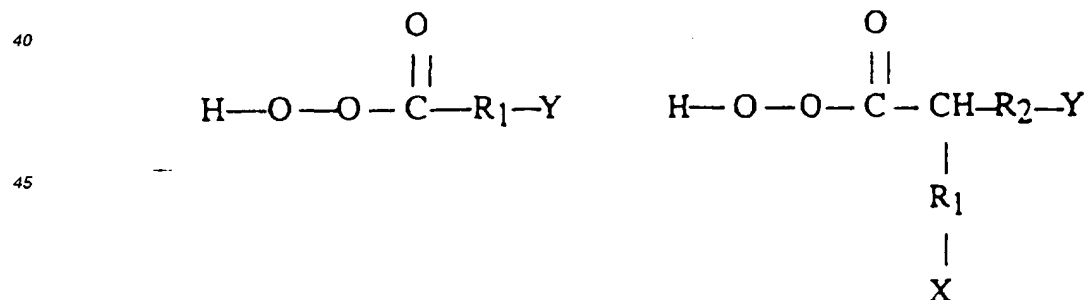
Revendications

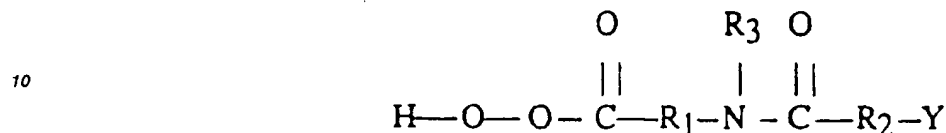
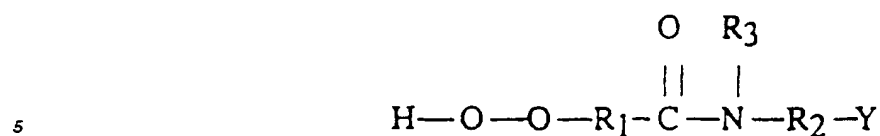
1. Composition de blanchissage comprenant des quantités efficaces d'un agent de blanchiment peroxyacide et d'un agent de libération des salissures, caractérisée en ce que ladite composition comprend une source d'alcalinité et dans laquelle ledit agent de libération des salissures est choisi parmi:

- A. les éthers alkyls et hydroxyalkyls de cellulose contenant de 1 à 4 atomes de carbone dans le groupement alkyle et ayant un degré molaire de substitution de 1,5 à 2,7 et une masse moléculaire moyenne en nombre de 2 000 à 100 000;
- B. les polymères comprenant de l'éthylène-téréphtalate et du polyoxyéthylène-téréphtalate, dans un rapport molaire de 1:10 à 10:1, ledit polyoxyéthylène-téréphtalate contenant des motifs polyoxyéthylène ayant une masse moléculaire moyenne en nombre de 500 à 10 000, et ledit agent de libération des salissures ayant une masse moléculaire moyenne en nombre de 1 000 à 100 000;
- C. les polymères comprenant du propylène-téréphtalate et du polyoxyéthylène-téréphtalate, dans un rapport molaire de 1:10 à 10:1, ledit polyoxyéthylène-téréphtalate contenant des motifs polyoxyéthylène ayant une masse moléculaire moyenne en nombre de 500 à 10 000, et ledit agent de libération des salissures ayant une masse moléculaire moyenne en nombre de 1 000 à 100 000; et
- D. les polymères comprenant de l'éthylène-téréphtalate et/ou du propylène-téréphtalate en toute proportion et du polyoxyéthylène et/ou du polyoxypropylène en toute proportion, pour que le rapport molaire entre l'éthylène-téréphtalate plus le propylène-téréphtalate et le polyoxyéthylène plus le polyoxypropylène soit de 1:10 à 10:1, lesdits motifs polyoxyéthylène et lesdits motifs polyoxypropylène ayant chacun une masse moléculaire moyenne en nombre de 250 à 10 000, et ledit agent de libération des salissures ayant une masse moléculaire moyenne en nombre de 1 000 à 100 000;

et leurs mélanges;
dans laquelle le rapport pondéral de l'oxygène actif (AcO) dans ledit agent de blanchiment peroxyacide à l'agent de libération des salissures se situe dans la gamme de 10:1 à 1:10.

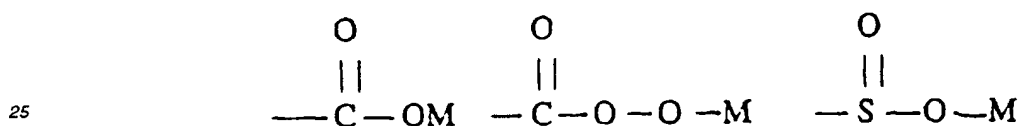
2. Composition selon la revendication 1, dans laquelle ladite composition est une composition sèche.
3. Composition selon l'une quelconque des revendications 1 ou 2, dans laquelle le rapport pondéral de l'oxygène actif (AcO) dans ledit agent de blanchiment peroxyacide à l'agent de libération des salissures se situe dans la gamme de 5:1 à 1:5.
4. Composition selon la revendication 3, dans laquelle ledit rapport pondéral est de 2:1 à 1:2.
5. Composition selon l'une quelconque des revendications 1-4 dans laquelle ledit agent de blanchiment peroxyacide est choisi parmi:





où R_1 et R_2 sont des groupes alkylène contenant de 1 à 20 atomes de carbone ou des groupes phénylène, R_3 est un atome d'hydrogène ou un groupe alkyle, aryle ou alkylaryle contenant de 1 à 10 atomes de carbone, et X et Y sont choisis parmi les atomes d'hydrogène, les atomes d'halogène, et les groupes alkyle, aryle, ou tout groupe apportant un groupement anionique en solution aqueuse.

6. Composition selon la revendication 5, dans laquelle X et/ou Y sont choisis parmi:



où M est un atome d'hydrogène ou un cation formant un sel soluble dans l'eau.

7. Composition selon l'une quelconque des revendications 1-6, dans laquelle ledit agent de libération des salissures est un polymère de méthylcellulose et ledit agent de blanchiment peroxyacide est l'acide diperoxydodécanedioïque.

8. Composition selon l'une quelconque des revendications 1-7, dans laquelle ladite composition est une partie d'un article passant dans tout le lavage et dans laquelle ledit agent de blanchiment peroxyacide et ledit agent de libération des salissures sont enfermés dans un sachet fait d'une matière de substrat insoluble dans l'eau, mais perméable à l'eau.

9. Composition de blanchissage comprenant une quantité efficace d'un agent de libération des salissures et d'un précurseur d'agent de blanchiment peroxyacide organique et un composé de blanchiment peroxygéné capable de produire du peroxyde d'hydrogène en solution aqueuse, de manière à produire ainsi une quantité efficace de peroxyacide, caractérisée en ce que ladite composition comprend une source d'alcalinité et dans laquelle l'agent de libération des salissures est choisi parmi:

A. les éthers alkyls et hydroxyalkyls de cellulose contenant de 1 à 4 atomes de carbone dans le groupement alkyle et ayant un degré molaire de substitution de 1,5 à 2,7 et une masse moléculaire moyenne en nombre de 2 000 à 100 000;

B. les polymères comprenant de l'éthylène-téréphtalate et du polyoxyéthylène-téréphtalate, dans un rapport molaire de 1:10 à 10:1, ledit polyoxyéthylène-téréphtalate contenant des motifs polyoxyéthylène ayant une masse moléculaire moyenne en nombre de 500 à 10 000, et ledit agent de libération des salissures ayant une masse moléculaire moyenne en nombre de 1 000 à 100 000;

C. les polymères comprenant du propylène-téréphtalate et du polyoxyéthylène-téréphtalate, dans un rapport molaire de 1:10 à 10:1, ledit polyoxyéthylène-téréphtalate contenant des motifs polyoxyéthylène ayant une masse moléculaire moyenne en nombre de 500 à 10 000, et ledit agent de libération des salissures ayant une masse moléculaire moyenne en nombre de 1 000 à 100 000; et

D. les polymères comprenant de l'éthylène-téréphtalate et/ou du propylène-téréphtalate en toute proportion et du polyoxyéthylène et/ou du polyoxypropylène en toute proportion, pour que le rapport molaire entre l'éthylène-téréphtalate plus le propylène-téréphtalate et le polyoxyéthylène plus le polyoxypropylène soit de 1:10 à 10:1, lesdits motifs polyoxyéthylène et lesdits motifs polyoxypropylène ayant chacun une masse moléculaire

moyenne en nombre de 250 à 10 000, et ledit agent de libération des salissures ayant une masse moléculaire moyenne en nombre de 1 000 à 100 000;

et leurs mélanges;

5 dans laquelle le composé de blanchiment peroxygéné et l'agent de libération des salissures sont présents dans un rapport de 30:1 à 1:10, en poids de l'oxygène actif du composé de blanchiment peroxygéné par rapport à l'agent de libération des salissurés.

10 10. Composition selon la revendication 9, dans laquelle ladite composition est une composition sèche.

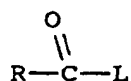
11. Composition selon l'une quelconque des revendications 9 ou 10, dans laquelle ledit rapport est de 15:1 à 1:2.

12. Composition selon la revendication 11, dans laquelle ledit rapport est de 3:1 à 1:2.

15 13. Composition selon l'une quelconque des revendications 9-12, dans laquelle la composition produisant du peroxyacide comprend:

(a) un composé de blanchiment peroxygéné capable de produire du peroxyde d'hydrogène en solution aqueuse et

20 (b) un activateur de blanchiment de formule générale:



25 dans laquelle R est un groupe alkyle contenant de 5 à 18 atomes de carbone, où la chaîne alkyle linéaire la plus longue s'étendant de l'atome de carbone du groupe carbonyle et comprenant cet atome contient de 6 à 11 atomes de carbone et L est un groupe partant, dont l'acide conjugué possède un pKa dans la gamme de 6 à 13.

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